Formula Sheet For General Chemistry (Nov. 16 2007)
Blinn College Learning Center

DESCRIPTION	EQUATION
Ideal gas equation	$PV = nRT$
Adibiatic change	$PV = k$
Charles' Law	$\frac{V}{t} = k$
Bohr Radius	$a_0 = \frac{\hbar^2}{m_e k e^2}$
Radii of stable orbits in the Bohr model	$r = n^2 \frac{\hbar^2}{m_e k Z e^2} = n^2 \frac{a_0}{Z}$
Van der Waals equation	$\left(P + \frac{an^2}{V^2}\right)(V - bn) = nRT$
Entropy Change	$\Delta S^\circ = \sum S^\circ \text{products} - \sum S^\circ \text{reactants}$
Enthalpy Change	$\Delta H^\circ = \sum H_f^\circ \text{products} - \sum H_f^\circ \text{reactants}$
Gibb's Free Energy Change Defined	$\Delta G^\circ = \sum G_f^\circ \text{products} - \sum G_f^\circ \text{reactants}$
Gibb's Free Energy Change in Terms of Enthalpy, Absolute Temperature, and Entropy	$\Delta G^\circ = \Delta H^\circ - T\Delta S^\circ$
Gibb's Free Energy Change in Terms of Gas Constant, Absolute Temperature, and Equilibrium Constant	$\Delta G^\circ = -RT \ln K = -2.303 RT \log K$
Gibb's Free Energy Change in Terms of Number of Moles, Faraday, and Standard Reduction Potential	$\Delta G^\circ = -n\Im E^\circ$
Reaction Quotient	$Q = \frac{[C]^c[D]^d}{[A]^a[B]^b}$ $where \quad aA + bB \rightarrow cC + dD$
Electric Current	$I = \frac{q}{t}$
Cell Voltage	$E_{cell} = E_{cell}^\circ - \frac{RT}{n\Im} \ln Q = E_{cell}^\circ - \frac{0.0592}{n} \log Q$

Relationship between Equilibrium Constant and Cell Voltage	$\log K = \frac{nE^\circ}{0.0592}$
Molar Heat Capacity at Constant Pressure	$C_p = \frac{\Delta H}{\Delta T}$
Partial Pressure of a Gas	$P_A = P_{total} X_A$ $where \quad X_A = \frac{moles \quad A}{total \quad moles}$
Total Gas Pressure as Sum of Partial Pressures	$P_{total} = P_A + P_B + P_C + \ldots$
Number of Moles	$n = \frac{m}{M}$
Temperature in Kelvin from Degrees Celsius Conversion	$K =^\circ C + 273$
Combined Gas Law	$\frac{P_1 V_1}{n_1 T_1} = \frac{P_2 V_2}{n_2 T_2}$
Density of a Material	$D = \frac{m}{V}$
Root Mean Square Velocity of Gas Molecules	$u_{rms} = \sqrt{\frac{3kT}{m}} = \sqrt{\frac{3RT}{M}}$
Kinetic Energy per molecule	$\frac{KE}{molecule} = \frac{1}{2} m v^2$
Kinetic Energy per Mole	$\frac{KE}{mole} = \frac{3}{2} RTn$
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Graham's Law of Effusion	$\frac{r_1}{r_2} = \sqrt{\frac{M_2}{M_1}}$
Molarity Defined	$molarity, \quad M = \frac{moles \quad solute}{liter \quad solution}$
Molality Defined	$molality, \quad = \frac{moles \quad solute}{kilogram \quad solvent}$
Freezing Point Depression	$\Delta T_f = i K_f \times molality$

Boiling Point Elevation	$\Delta T_b = iK_b \times molality$
Osmotic Pressure	$\pi = \frac{nRT}{V} i$
Specific Heat Capacity to Heat Equation	$q = mc\Delta T$
Acid Ionization Constant	$K_a = \frac{[H^+][A^-]}{[HA]}$
Base Ionization Constant	$K_b = \frac{[OH^-][HB^+]}{[B]}$
Ion Product Constant for Water	$K_w = [OH^-][H^+] = K_a \times K_b = 1.0 \times 10^{-14} \quad at \quad 25°C$
pH Defined	$pH = -\log [H^+]$
pOH Defined	$pOH = -\log [OH^-]$
pH and pOH Relationship	$14 = pH + pOH$
Buffer Design Equation	$pH \approx pK_a - \log \frac{[HA]_0}{[A^-]_0}$
pOH and Base Ionization Equilibrium Constant Relationship	$pOH = pK_b + \log \frac{[HB^+]}{[B]}$
pK_a Definition	$pK_a = -\log K_a$
pK_b Definition	$pK_b = -\log K_b$
Gas Pressure and Concentration Relationship	$K_p = K_c (RT)^{\Delta n}$
Planck's Quantized (Quantum) Energy Equation	$\Delta E = h\nu$
Speed of Light to Wavelength and Frequency Relationship	$c = \lambda\nu$
De Broglie Wavelength	$\lambda = \frac{h}{mv}$
Linear Momentum	$p = mv$
Relationship between Energy and Principal Quantum Number	$E_n = -R_H \left(\frac{1}{n^2}\right) = \frac{-2.178 \times 10^{-18}}{n^2} joule$

Rydberg Equation	$\Delta E = R_H \left(\frac{1}{n_i^2} - \frac{1}{n_f^2} \right)$
van't Hoff equation	$\ln \left(\frac{K_2}{K_1} \right) = -\frac{\Delta H^\circ}{R} \left[\frac{1}{T_2} - \frac{1}{T_1} \right]$